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ARGENTINA

SALTA WATERS POLLUTED WITH ARSENIC

Buenos Aires LA RAZON in Spanish 14 Aug 77 p 5

[Text] Salta--The General Agriculture Office has confirmed to the press that analyses of subterranean water samples have determined the presence of arsenic. The authorities of that office stated that the presence of arsenic in that province was detected when samples from various locations in the departments of Rivadavia, Anta and San Martin were tested. The tests showed that in some places the arsenic content in the water reaches levels greater than those established by international regulations for toxic and waste materials. In view of this situation the local authorities are working on an agreement with national organizations in order to test the basins of the Juramento and Bermejo Rivers and surrounding areas of Pilcomayo with the objective of delineating the polluted areas and taking the necessary measures. It should be pointed out that pursuant to an accusation made by the news media it was affirmed that the continuous ingestion of water with arsenic produces cancer-causing callouses on the hands and feet.

CSO: 5000

BRAZIL

CAPIVARI RIVER POLLUTION LEAVES VINHEDO WITHOUT WATER

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 16 Aug 77 p 21

[Text] Campinas -- In a decree signed Sunday, the prefect of Vinhedo, Jose Carlos Gasparini, declared the situation of the municipality's drinking water supply a public catastrophe. The Capivari River, the principal impoundment source, is completely polluted and two small streams are being affected by the drought. The authorities of the small city (20,000 inhabitants) believe there will be a breakdown in the whole water network within the next few days if immediate measures are not taken.

The residents of Vinhedo have been feeling the effects of the precarious situation of the system for a month, with distribution being staggered between districts. The indiscriminate use of water, such as washing cars and sidewalks anywhere within the city limits was banned; violators will have their supply cut. The measure was announced to the population through "an appeal to the people" in the form of a circular in which the prefect states: "We are going through a critical phase regarding the water supply and the understanding and collaboration of the people is necessary more than ever."

Sunday morning the situation reached an intolerable level, according to prefect Jose Carlos Gasparini of the Brazilian Democratic Movement (MDB), who even before assuming office had been warning about the problem. After touring the sources polluting the Capivari River and the water reservoirs, the prefect decreed the state of public catastrophe and communicated the fact to the 8th Military Police Battalion Command. Last night, a Bandeirantes Palace aide contacted the office chief, Moacyr Dellaqua, by telephone to report that he had taken conizance of the situation and that the government's Civil Defense Coordinator's Office would take care of the matter. Yesterday Basic Sanitation Technological Center (Cetesb) experts visited the sites regarded as critical.

In the public catastrophe decree, the Vinhedo prefect stated that the drought has lasted for several months in the region and has caused a great reduction in the volume of water in the streams, and that the water of the Capivari River is highly polluted because it receives the wastes of companies

located above the impoundment. He observed also that "although this situation had been reported to the appropriate state agencies, nothing was done and the highly polluting chemical products continued to be dumped into the river, representing a serious threat to the health of the people of Vinhedo."

#### Impoundment

Impoundment of water in the Capivari River has been suspended because there is the danger of the spread of disease. "I prefer to leave the city without water than risk affecting the health of the population," said Jose Carlos Gasparini. The largest polluting factory, Sitol of Jundiai, is located alongside the Anhanguera highway and, according to the experts of the Vinhedo prefecture, there are illegal connections for dumping the wastes. Thousands of fish have already died as a result of the dumping, according to people who live along the river and the employees of a restaurant specializing in roast chicken. Five packing houses also contribute to aggravating the situation because the waters poured into the Capivari are not treated.

Jose Carlos Gasparini recently sent a strongly worded official letter to the Cetesb director's office relating the problems the municipality has been facing with pollution. "As if the aforementioned problems were not enough," he declared, "the Cetesb has now approved the construction and installation of a foundry near the center of the city and near the local hospital." Further on he says that "several memoranda pertaining to the cases mentioned are going through channels in that agency and are awaiting final decision," and for that reason he requests that "a position be taken in order that we may inform the complaining population of the measures taken."

The Cetesb replied through its director-president, engineer Renato Della Togna, that the Campinas regional unit has been handling the matter in question and that a program has been drafted and the necessary funds have been approved to survey the area, intensifying inspections of the polluting sources in order to minimize the pollution of that water source."

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## BRAZIL

### RESENDE MAYOR FEARS NUCLEAR PLANT POLLUTION

Rio de Janeiro JORNAL DO BRASIL 22 Aug 77 p 12

Text Fearing pollution from nuclear wastes, the mayor of Resende, Noel de Carvalho, will request explanations in the next few days from the president of the republic and the special secretary for the environment, Paulo Nogueira about the uranium enrichment plant to be constructed in the municipality, since "until now, I have not managed to get anyone to give me any practical information about the matter."

"After all, I am mayor of this municipality and my office is full of people, mainly doctors who live here, asking for explanations about the plant and all I can report is that it is going to pollute just as much as a guava paste plant, since this was the only explanation I obtained until now from the technicians of Nuclebras Brazilian Nuclear Corporations," said Noel de Carvalho, who is also waiting for the briefing requested from the state on 22 June.

#### Background

The plant will be constructed by Nuclei, Nuclebras Isotopic Enrichment Corporation an affiliate of Nuclebras (75 percent of the capital), with the German companies, Steag and Interatom International Atomic Reactor Construction Ltd. As the president of Nuclebras, minister Paulo Nogueira Batista reported in a conference at the War College (22 June), in early 1978, they will start the foundations and the infrastructure of the plant, which is to go into operation in 1982, "in time to enrich uranium for the first recharges of Angra-2 and 3."

In a recent interview, the director of the UFRJ expansion unknown Institute of Biophysics, Prof Eduardo Pennafranca

explained: "The gases released by an enrichment plant, its wastes, are as toxic as those of any other chemical industries, but the reprocessing plant is going to demand a number of precautions, because the wastes it produces cannot be discharged into the environment: They must be separated, isolated from any contact with the outside world for hundreds of years."

"The problem is that man has never handled anything in the past with so many risks and nuclear plants are not the same as any other plant. Obviously they require foolproof safety conditions and several countries are developing safety measures. The main thing is that people need to be informed that uranium is not an especially toxic substance as published and advised about the precautions which will be taken and the safety guarantees."

#### The Mayor

Noel Carvalho made a point of explaining that he is neither for or against setting up a plant in Resende: "I only want to be informed about the matter, because I owe an explanation to the people who live here." Concerned, he called on Nuclebras, but he only got an answer on a highly technical level.

"Since I am a businessman and I do not know anything about nuclear power and since I was also warned about possible risks by the president of the State Engineering Foundation for the Environment, I am worried about the problem." What did he learn from Haroldo de Matos? That in case of accident at the plant, about 8 million persons, even in Rio de Janeiro, will be without a drinking water supply, because of contamination of the Paraiba do Sul River.

But there was another reason for the mayor's anxiety: "I was disturbed about the problem from the moment when I read an article in the magazine VEJA, in which the American historian, Warren Dean sharply criticized uranium enrichment plants."

According to him, no company in the United States wants to enter this field, because the technology is not sufficiently developed and has only produced problems, "which are a disaster for the environment." He also reports that various plants in the country were closed after lawsuits initiated by injured parties. And he warns "the danger is frightful for the Brazilians, even after the basic technology has been mastered."

Up till then, the mayor was an enthusiast for national atomic energy: "I have a document here which can prove my support of the Brazilian government regarding the agreement signed with Germany"--and he shows the telegram sent to President Geisel at the time of the controversy with the United States. "What I could not imagine was that this plant would be constructed later on here in my municipality."

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## BRAZIL

### NOISE POLLUTION THREATENS RIO AND SAO PAULO

Rio de Janeiro O GLOBO in Portuguese 29 Aug 77 p 8

/Text/ The noise index in Rio and Sao Paulo (cities recorded among the six noisiest in the world) is increasing, matching the yearly rates of 1.8 to 2 decibels of their "competitors--Tokio, New York, San Francisco and Rome. The report is from Alberto Vieira de Azevedo, president of the Acoustic Studies Committee of ABNT /Brazilian Technical Standards Association/ who even claims that WHO already fears the emergence of a deaf population in those cities.

In Rio, for example, the noise average ranges between 85 and 90 decibels. Any noise of 140 decibels means bursting the ear drums. Mathematically, according to this annual progression, we could have a population of deaf people in the year 2000. WHO fears that this is going to happen around the year 2100 since the noise escalation possibly will decline numerically. However, considering the problem scientifically, we not only want this increase to drop, but also the escalation to stop.

In order to stop it, since January 1977, Alberto Vieira de Azevedo, who is also the coordinator, from the Brazilian point of view, in the International Acoustics Committee (ISO-TC /expansion unknown/43) began a work entitled the Problem of Urban Acoustics, sponsored by ABNT in agreement with the Engineering Club, which will be completed at the end of September. He said that more than 400 apartment dwellers in Leblon, Copacabana, Meier and downtown were then interviewed about the problem, since the main objectives of the research are "to diagnose and point out noise abatement solutions." Meanwhile, the president of the ABNT Acoustic Studies Committee emphasizes it is necessary to understand that "we are a consultative and standards organization, never legislative or executive.. We give the opinion--the rest depends on the authorities."

## Noise Privacy

The result of the research in four districts (made by 20 persons in 3 months) revealed a fact that Alberto de Azevedo considered strange at first and then "important."

"I really expected that the persons interviewed would complain most about noises created by traffic. I never would have expected the high percentage of complaints about noises made by neighbors, a result of poor construction. We divided these districts into a noisy zone (above 85 db), average (75 to 85 db) and quiet (55 to 75 db) and the percentage of this type of complaint was high in all three of them.

"In the noisy zone (all of downtown, parts of Copacabana such as Avenida Nossa Senhora de Copacabana and Rua Barata Ribeiro, sections of Leblon, such as avenues Ataulfo de Paiva and General San Martin and parts of Meier, such as Avenida Amaro Cavalcanti and Rua Dias da Cruz), 39 percent of those interviewed complained about outside noises and 36 percent about those made by their neighbors.

"In the average zone (cross streets in Leblon such as Jeronimo Monteiro, Rita Ludolf and Aristides Spinola, some in Copacabana such as Domingos Ferreira, Leopoldo Miguez and Aires Saldanha, and others in Meier, such as Vileia Tavares, Barao de Sao Borja and Carolina Santos) 26 percent complained about outside noises and 53 percent about those produced by their neighbors.

"In the quiet zone (some streets in Leblon such as Aperana and Sambaiba and others in Meier such as Dionisio Fernandes and Venancio Ribeiro, 3 percent complained about outside noises and 78 percent about those made by neighbors."

Alberto de Azevedo says a comparative study was made on old and new buildings, also based on answers supplied by neighboring residents.

"In the old buildings, 21 percent of the residents were disturbed during sleeping hours, while in the new buildings, approximately 5 years old, this index increased to 56 percent. This means that there is no more noise privacy, when in fact sound insulation of dwellings is a vital human need."

Explaining, moreover, that the research data does not cover 100 percent of the sampling because some residents (19 percent of the quiet zones, 21 percent of the average zones and 25 percent of the noisy zones) "were not able to answer the questions for various reasons, such as not paying attention to the problem," Alberto de Azevedo provides other factors:

"We also found out that, with insulation of about 50 db through pavements and walls, only 26 percent of the residents are disturbed by noise. For insulation of about 45 db, this percentage rises to 42 db. In cases of very low insulation (30 to 35 db) mainly in modern buildings, this index increased to more than 85 percent, with there even being complaints to the authorities. They speak of economy in this type of flimsy construction, but economy how, in what way? Destroying the human being?

"Formerly, he adds, buildings were made with materials more resistant to sound penetration, with, for example, thick walls made with solid bricks; today, however, walls are thin, made with superlight bricks (perforated) and this without mentioning the doors and windows, before heavy and solid, now light and flimsy."

### Solutions

After diagnosing noises in adjacent areas and pointing out the solution of return to the old-type construction, the president of the ABNT Acoustic Studies Committee mentioned sources of outside noise, "whose noise levels are rising every day":

"Traffic, record stores, metro and building construction. These problems were also investigated with residents being interviewed and now we are establishing percentages for them. For us to find solutions, in these cases, we must bear in mind that construction is temporary and the problems of traffic and record stores permanent."

Thus he says, "we have to divide to conquer." For example, he mentions combating horns in traffic and uncontrolled exhausts:

"In a recent work, we proved that 78 percent of horn blowing is unnecessary. Then this would be solved with the locking horn, in a process in which, if the car's speed is reduced, no noise comes out. The prospects for the compulsory installation of this locking system are also being discussed in the

National Congress. As for uncontrolled exhausts, it would be through fines connected with Detran [Traffic Department]--in this case there is already a municipal law in this respect, in the experimental stage. As for the record stores, the solution would be to compel them to have small audition studios--unfortunately, there is a law about this which was applied, but now there is no inspection. We have to enforce these laws."

Now to prevent noise in metro and building construction "the methods would be much more sophisticated," declares Alberto de Azevedo:

In the case of the use of compressed air equipment, for example, the solution would be a sort of sound insulation capsule in which the operator would work with individual protection. In the case of circular saws, they would be mounted in special cabins. Diagnosis must always precede treatment; meanwhile, noise protection generally is based on three important lines of action: attacking the noise at its source, preventing sound propagation and soundproofing.

"In order not to have a population of invalids, he adds, "these methods become extremely necessary and to reach this conclusion, it is enough to analyze average noise in Rio, from 85 to 90 db, which is very high, considering that noise ailments appear in four stages, in accordance with a scale which I made.

"Up to 55 db, there are no problems of any type, from 56 to 75 db, the discomfort stage begins, but still without damage to individual health. From 76 to 85 db, noise already can affect a person's health and above 85 db, it is certain the person will be affected, taking into consideration the duration of his exposure to noise. For example, in a range of 7 to 8 hours of daily exposure, in a year or two, the individual will be deaf, in this fourth stage."

Alberto de Azevedo even mentions a work in this respect about how noise can affect the person--he did this research 2 years ago in conjunction with Dr Aristides Monteiro and engineer Luis Alberto Palhano Pedrosa:

"First, everything depends on each organism, since every person has a different reaction, which ranges from deafness to neurosis and it must be emphasized that neurosis due to noise causes insanity and can go so far as murder. Besides this, noise causes congestion, organic disfunctions and some doctors even claim it brings about abortion."

## BRAZIL

### AIR POLLUTION IN CUBATAO HIGHER THAN IN GREATER SAO PAULO

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 6 Sep 77 p 17

[Text] Santos -- The Basic Sanitation Technological Center (Cetesb), which systematically withholds information on the indices of pollution in the air in Cubatao, has finally admitted in its house bulletin for the month of July that the level of atmospheric contamination in the city is higher than that of Greater Sao Paulo and of the capital itself. It revealed the data of a survey made in the area, which the experts considered alarming. With an area of only 148 square kilometers and a population of under 75,000, Cubatao has become officially one of the most polluted cities -- if not the most polluted city in Brazil.

According to the Cetesb data, the emission of Carbon monoxide in Cubatao is 469 tons a day compared to 318 tons a day poured into the Greater Sao Paulo area and the capital. The burning of fuels in stationary sources cause the chemical industries to release 146 tons of sulphur oxide daily compared to 42 tons in Sao Paulo and 133 in the whole metropolitan area. Those same industries also emit 84 tons of particles compared to 58 in Greater Sao Paulo and only 3 tons in the capital. According to the Cetesb, these indices make the air of Cubatao unfit to breathe.

In view of this information, the prefect of Cubatao, Carlos Frederico Soares de Campos yesterday repeated an old offer to the State Basic Sanitation Company: the municipality would turn over an area of 2,000 square meters to the company to install a regional office and a complete air pollution index measuring station in the municipality. That proposal had already been made in 1974 by former prefect Zadir Castelo Branco, who also offered municipal employees and transportation to reduce the cost of installing the equipment, but the Cetesb did not accept it.

#### Minimizing

The information on the new proposal that will be made by the prefecture was given by Pedro Tosta de Sa, president of the Council for the Defense of the Environment of Cubatao (Condemna) who, meanwhile, sought to minimize the problem, alleging that the matter is not as serious as it may seem: "The



northwesterly, westerly or northerly winds, which are the ones that carry the pollutants to the city, and for that matter as far as Santos and the whole Santos Lowland, blow only 28 days a year."

Even so, according to him, those days "are spaced, whereas in the ABC and in Sao Paulo the pollution is within the cities, which does not happen in Cubatao." Despite that statement, at around 1400 yesterday afternoon, a good part of the atmosphere of Cubatao was covered by a red cloud as the result of ferrous oxide emanating from the cleaning of the Sao Paulo Iron and Steel Company (Cosipa) blast furnaces. That material is very harmful to the health but thus far the iron and steel company has not installed filters, contrary to what it has promised.

Pedro Tosta de Sa insisted on what he termed the "correct interpretation" of the Cetesb data, saying that "they are correct but they were collected at the emission source (chimneys), which does not necessarily mean that the air is polluted." According to him, the indices of pulmonary ailments in the municipality are no higher than those in other nonindustrial cities. In addition, in his opinion, the low income of the population and the high humidity index (it rains 4,000 millimeters per year in the region) are factors that affect ailments of that type.

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BRAZIL

OIL WELL RESIDUES KILL CATTLE IN BAHIA STATE

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 6 Sep 77 p 17

[Text] Salvador -- Twenty cattle have already died in the last 2 months in the municipality of Catu (80 kilometers from Salvador) from a strange malady caused by the waters of the Osso de Boi stream where the Brazilian Petroleum Corporation (Petrobras) has been emptying the residues of four new oil wells drilled during the last 6 months.

The charge, made by ranchers in the region, was confirmed yesterday by Councilman Jaime Lippo Acioli of the local National Renewal Alliance (ARENA), who pointed out: "Twelve cattle died in a single ranch during the last 30 days." One of the ranchers, Raimundo Calazans Adler, took biologist Fortunato Barata to the site yesterday where he collected some material and took it to the biological institute of the Federal University of Bahia for examination.

The Osso do Boi stream is one of the branches of the Una River which supplies the city of Catu with drinking water. The stream crosses about 14 ranches in the municipality along a course of 20 kilometers.

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BRAZIL

REFORESTATION PROGRAM TO BE INITIATED IN PORTO ALEGRE

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 9 Sep 77 p 13

[Text] Porto Alegre -- The first really ecological reforestation program in Rio Grande do Sul will be launched in Porto Alegre today by the Secretariat of Agriculture in collaboration with the Brazilian Forestry Development Institute (IBDF) to recalcum the river banks and headwaters that are almost deforested, with consequent harm to the environment and the dams. The Secretariat of Agriculture will distribute seedlings financed by the IBDF and will provide guidance to the landowners in planting and conservation.

The first part of the program will cover a strip of 70 kilometers on both banks of the sources of the Jacui River, one of the principal rivers in the state, which reaches the municipalities of Espumoso, Tapera and Selbach. The Passo Real dam the area of which will also be reforested by the State Electric Power Company is in that region. Seventy-six landowners signed an agreement pledging to plant and care for the trees.

Fruit trees such as the Brazilian cherry, cherry and jabuticaba will be planted on the near strip of the river; and on the far strip, indigenous trees such as mimosa, capria, purple mimosa, cedar, Brazilian pine and jacaranda, and foreign trees such as pine and eucalyptus.

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IRAN

# SWISS BIOLOGIST WARNS AGAINST POLLUTION PERIL

Teheran TEHRAN JOURNAL in English 3 Sep 77 p 3

[Text]

TEHRAN — Prominent Swiss biologist Dr. Carl Bader Thursday warned against the growing level of poison in Iranian rivers and underground irrigation systems. these ingenious inventions of Old Persia and also succeeded in finding the sources of some rivers which do not dry out during the hot season."

"I implore you — do something for your beautiful country! The children of future generations will thank you for it," Bader said.

The world renowned scientist is currently visiting Iran at the invitation of Tehran University Professor Dr. Hossain Sepasgozarian.

Bader said he had carried out zoological investigations on running waters in Iran during the early months of summer this year, in cooperation with Iranian scientific research centers.

"We undertook biological research on many ghanats (underground irrigation systems),

"Unfortunately many of our samplings yielded no results. But in some cases we noted a severe poisoning of the waters tested."

CSO: 5000

NEED FOR FRESHWATER FISH FARMS REPORTED

Johannesburg THE STAR in English 9 Sep 77 p 17

[Text]

Dwindling catches of sea fish and rising prices of this essential source of human and livestock protein made it essential that South Africa increase its production of freshwater fish, the Transvaal Agricultural Union congress was told yesterday.

Mr Sid Viljoen, a fish farmer from Marble Hall, told the congress that in countries like China, freshwater fish was one of the main sources of nutrition.

This new source of food should be seen against the projected long-term short-

age of red meat, he said.

Although South Africa had 53 registered freshwater fish farmers — 44 in the Transvaal — there was still much that this country could learn from America, Japan and Israel.

Valuable research work was being done by the Transvaal Provincial Administration, and costly preparation work by the Freshwater Fish Corporation, but much still had to be done.

Mr Viljoen said there was no shortage of suitable sites for building freshwater fish dams with reliable water sources.

Speaking on agricultural control boards, Mr Greyling Wentzel, chairman of Eastern Tvl Co-operative, said appreciable savings could be made by the amalgamation of related boards.

For instance it was not necessary for each control board to send its own delegation abroad to study market conditions.

Boards could also make savings through joint statistical work, he said.

CSO: 4420

REPUBLIC OF SOUTH AFRICA

OVER-FISHING CAUSES BIRDS TO STARVE

Johannesburg THE STAR in English 3 Sep 77 p 5

[Text]

DURBAN — Mass starvation caused by serious over-fishing off South Africa's eastern seaboard may be responsible for the deaths of countless Cape Cormorants off the Transkei and East Cape coasts.

Mr P A Clancy, director of the Durban Museum, said he thought it likely that depleted food stocks could be the root cause of their deaths.

"With the tremendous fishing operations carried on off the east coast by South African and foreign fishing groups, there is a distinct possibility of starvation for the birds."

Mr Clancy pointed out that cormorants had been seen off the Natal coast in far greater numbers this year than previously, and said he believed it was possible that the birds had moved north early in search of food.

At present the largest concentration of dead birds appears to have been in the East London — Port Elizabeth stretch, although dead birds have been found as far south as Knysna.

REPUBLIC OF SOUTH AFRICA

ENVIRAC PROTESTS WEED SPRAYING AT DAM

Johannesburg THE STAR in English 2 Sep 77 p 7

[Text] Unless drastic action is taken, hyacinth will cover all of Hartbeespoort Dam by April 1978, Dr J. P. Kriel, secretary of the Department of Water Affairs, has told CARE.

The department intends spraying the weed in about six weeks.

The Star's CARE campaign approached Water Affairs on behalf of Envirac, an environmental group at Witwatersrand University.

Envirac warned that if the weed was sprayed it would sink and reduce the oxygen content in the water, killing fish.

Water Affairs said harvesting the weed would cost R620,000. Spraying "costs only a fraction of this amount."

During spraying it was found that plants decayed on the surface, which lessened the danger of eutrophication.

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## POLLUTION CONTROL USED AT MAJOR THERMAL POWER PLANTS

Moscow ELEKTRICHESKIYE STANTSII in Russian No 6, Jun 77 pp 2-3

[Article by N. G. Zalogin and L. I. Kropp, Candidates in Engineering at the All-Union Thermotechnical Institute: "On the Necessary Degree of Removing Ash from Stack Gases at Major Thermal Electric Power Plants"]

[Text] In accordance with the "Directives on Calculating Atmospheric Dispersion of Harmful Substances Contained in Emissions from Enterprises" (SN 369-74), currently operative in the USSR, the greatest concentration of each harmful substance in the surface layer of the atmosphere must not exceed the maximum one-time limit of maximum permissible concentration (MPC m.o.) of the given substance, as set by the "Sanitary Norms for Industrial Enterprise Design" (SN 245-71).

Among principal harmful substances emitted together with stack gases from TES's (thermal electric power plants) are in the first place ash and the oxides of sulfur and nitrogen. Inasmuch as to reduce ash emissions into the atmosphere at absolutely all TES boiler-furnaces which burn solid fuel, ash-collectors are being installed on a mandatory basis, whereas corresponding collectors are not being employed to prevent emissions of gaseous impurities into the atmosphere, therefore, in accordance with the existing statute, design organizations have set the stack heights at new TES's, proceeding from the necessity for the airborne dispersion of the gaseous impurities, sulfur dioxide and nitrogen oxides, to a point where their concentrations are equal to or less than the allowable limit (MPC m.o.). In this case, as a rule, the ash concentration at the surface layer, provided that the TES is equipped with up-to-date ash collectors, will prove to be significantly less than the MPC m.o.<sup>o</sup>

The degree of eliminating ash from the gases which would ensure an ash concentration in the surface layer of the atmosphere equal to the MPC m.o. on condition that the stack height at the new TES be set to disperse sulphur dioxide and nitrogen, may be calculated in accordance with the following simplified formula:

$$\eta = 1 - \frac{SP_O + NO^P_X}{AP_{ayh}},$$



where  $A^p$  and  $SPoS$  are the respective percentages of ash and sulfur content in the operating fuel,  $a_{yh}$  is the ash carry-off from pulverized-coal-fired furnaces with dry cinder removal, equal to 0.85, and  $NO^p_x$  is the emission of nitrogen oxides, conventionally expressed as a percentage of the fuel's operational volume.

If, according to this formula, one calculates the magnitude of  $\eta$  for a TES being designed, which would burn, for example, coal from the Moscow region, then the degree of removing ash from the gases would be equal to 82.2 percent. Thus, in a formal sense, in building a TES, especially one burning sulfurous coal, ash collectors are allowed to be installed with an extremely low level of gas purification, considerably lower than that which may be achieved using up-to-date ash-collecting equipment.

Despite this, the degree of gas purification in ash-collectors installed at new thermal electric power plants in the USSR as well as in other industrially developed countries has been adopted as the maximum, technically achievable and assimilated up to now by systems of ash collection. In our country, for example, management organs have indicated the need to equip the new, high-capacity boiler-furnace assemblies which burn solid fuel with ash-collecting units having a degree of gas purification amounting to 99.0-99.5 percent; the upper value, moreover, would have to apply for high ash-content fuels and the largest TES's.

Individual employees have doubts about the efficacy of implementing a higher degree of removing ash from gases than that which is formally required by the above-mentioned SN 369-74 and SN 245-71, since such an increase in standards would lead to increased costs for both construction and operation of TES's.

But in the opinion of those who have studied the problems of environmental protection the resolutions adopted by management organs concerning the need to utilize the most efficient and up-to-date technical means of eliminating fly ash from stack gases have weighty grounds in their favor and are in accord with the experience of world science and technology. The following ideas may be set forth to justify these resolutions.

In a hygienic appraisal of the harmfulness of TES fly ash it has been accepted that the latter's characteristics coincide most closely with non-toxic dust, such as, for example, that which is raised by transportation traffic or by the wind from road surfaces. In fact, it is known that the composition of fly ash from certain fuels also contains more harmful substances: for example, the free oxide of silicon, incompletely burned fuel particles, and, in small amounts, various substances which are even more harmful, such as compounds of arsenic, vanadium, lead, and mercury. The amount of these impurities contained in ash is usually significantly higher than their average content in the Earth's crust. Therefore, the ash of only certain fuels may be equated with non-toxic dust in calculations. At the present time we are lacking in still more detailed analyses of the ashes of various fuels, and their toxicity has not been determined in full measure. In connection with the foregoing, the possibility has not been excluded that

in the future the MPC for ash will be set in a differentiated manner, with consideration being given to the traits of its composition from various fuels.

The presently operative norms for atmospheric dust content ( $\text{MPC}_{\text{m.o.}} = 0.5 \text{ mg/m}^3$ ) merely indicate that the total concentration of dust in the air must not exceed this amount. No mention is made, however, of the dust's dispersion make-up. Moreover, it is known [1] that dust with a particle size of more than 10 microns does not penetrate into a person's lungs; it is retained in the upper respiratory tracts and expelled from the organism with comparative ease. On the other hand, dust particles which are approximately one micron in size do penetrate into the lungs, are retained there, and are the cause of a number of diseases. From this point of view the ash which is emitted into the atmosphere after passing through the TES's ash collectors is dangerous, since its composition includes about 30 percent of particles which are less than five microns in size.

It should also be noted that the processes whereby the atmosphere purifies itself from solid particles are dependent to a very great degree on their dispersion make-up. Thus, particles which are more than 10 microns in size fall to the Earth's surface relatively quickly; particles ranging in size from 4 to 10 microns rise with the smoke plume to an altitude of one kilometer and are carried for thousands of kilometers over the Earth's surface. Particles which are less than four microns in size attach poorly to raindrops, and they fall slowly, reaching the Earth's surface from an altitude of one kilometer during the course of a year. Particles of less than one micron, since they take part in Brownian movement, are dispersed throughout the atmosphere like gas molecules, and they settle on the Earth's surface only in special instances, such as when moisture condenses on them. Thus, highly dispersive fly ash is capable of accumulating in the atmosphere.

In this regard the gaseous impurities of stack gases -- the oxides of sulfur and nitrogen -- are less dangerous because their existence in the atmosphere is limited to approximately five days, during the course of which they are removed from the air, becoming dissolved in bodies of water and in precipitation, interacting with the ammonia which is given off by micro-organisms, and absorbed by soil and vegetation.

The accumulation of dust in the atmosphere in connection with the rapid development of power engineering, non-ferrous and ferrous metallurgy, and the building materials industry, also serving as sources for the emission of small-sized dust into the atmosphere, may lead to unfavorable consequences [2].

The dust which is in the atmosphere scatters solar radiation, reflecting back into space part of the energy which is falling onto the Earth. Measurements show that in large cities and industrial centers there is considerable loss in the intensity of solar radiation, especially in the ultra-violet area of the spectrum, which is the most active biologically. The scattering of light by one and the same mass quantity of dust is inversely proportional to the sixth power of the particle size.

Many scientists have stated the danger caused by the fact that in recent times the amount of dust entering the atmosphere as a result of man's economic activity is approaching, and in the future will exceed, the natural dust pollution of the atmosphere, which occurs principally as a result of volcanic activity and dust storms. This circumstance could lead to a change in the Earth's global climate [2], which would inflict more damage on mankind than the direct inhalation of air with a slight amount of dust. Moreover, it must be taken into consideration that the intensity of light scattering depends not only on the concentration of particles in the air but also on the thickness of the layer of dust-laden air. Hence, the dust concentration in the air may be allowable from a hygienic point of view, whereas the dispersion make-up of the dust and the thickness of the layer of the dust-laden air could bring about a completely non-allowable light scattering.

It follows, therefore, that in protecting the environment one must take into consideration not only the rigorous implementation of sanitary-hygienic requirements but also the aggregate of many other factors which have a direct or indirect influence on the activities of human beings and other organisms.

| Type of Coal,<br>by deposit | Initial dust<br>content of<br>gases (under<br>normal condi-<br>tions with<br>$\lambda = 1.4$ ) in $\mu\text{m}$ | Degree of Gas Purification (in %) Required by<br>Calculation Methods in Various Countries |                  |      |      |                  |
|-----------------------------|---|---|------------------|------|------|------------------|
|                             |   | USSR<br>By $\text{SO}_2$<br>+ $\text{NO}_2$   | By $\text{SO}_2$ | FRG  | USA  | Great<br>Britain |
| Kizelovskiy                 | 37.5  | 69.6  | 77.0             | 99.6 | 99.6 | 99.3             |
| Moscow Region               | 50.4  | 82.0  | 87.0             | 99.7 | 99.7 | 99.3             |
| GSSh                        | 47.5  | 80.5  | 88.0             | 99.7 | 99.7 | 99.3             |
| ASh                         | 24.9  | 78.0  | 91.0             | 99.4 | 99.4 | 99.3             |
| Ekibastuzskiy               | 62.3  | 93.4  | 98.0             | 99.7 | 99.7 | 99.3             |
| Kuznetskiy                  | 20.2  | 89.4  | 98.0             | 99.3 | 99.4 | 99.3             |
| Tom'usinskoye               |   |   |                  |      |      |                  |
| Nazarovskiy                 | 11.9  | 80.0  | 93.0             | 98.7 | 99.0 | 99.3             |

It is interesting to compare the results of calculations based on the formula cited above for the degree of eliminating ash from gases for TES's which burn the solid-energy fuels most prevalent in the USSR with analogous results obtained in calculations of these same values, based on methods which have been adopted in the FRG, USA, and Great Britain. In the FRG the ash concentration in the gases emitted into the atmosphere is limited to the amount of  $0.15 \text{ g/m}^3$ . In the USA the major power plants burning solid fuel the degree of removal of ash from gases must be no less than 99.3 percent. The results of such calculations are cited in the table above.

It follows from this data that for any fuels, and particularly for fuels containing a great deal of sulfur, in calculations based on the methods

adopted by us the magnitudes of  $\eta$  obtained are considerably less than those obtained abroad. Such an essential difference is partially explained by the fact that, for example, in the USA there are no requirements for a summation of the harmful effect of the oxides of sulfur and nitrogen, while there are limitations on the sulfur content of fuels in power production. Hence, the height of smoke stacks is less than those at similar TES's under our conditions, and the dispersion of solid particles occurs less intensively. Nevertheless, despite this circumstance, the requirements for removing ash from stack gases are more stringent in a number of foreign countries.

### Conclusion

Paying attention to the fact that the operational reliability of present-day ash-collecting units, especially that of electrostatic precipitators, is lower than that of the main power-producing equipment, and considering that electric power plants are designed and built to be run for a lengthy period of time, during the course of which it is possible that there will be an increase in the ceiling concentrations of dust in the air, as well as an increase in the unit capacities of modern-day TES's, the resolution on the need to utilize ash-collecting equipment with the maximum, technically attainable degree of gas purification must be acknowledged as correct.

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## PREVENTING POLLUTION OF RESERVOIRS AT POWER PLANTS

Moscow ELEKTRICHESKIYE STANTSII in Russian No 6, Jun 77 pp 4-6

[Article by G. T. Shkol'nik, G. A. Mendeleyev, Candidates in Engineering, V. N. Zelenin, T. V. Mikheyeva, Engineers, Ural Branch of the All-Union Thermotechnical Institute, Chelyabinsk: "On Preventing Pollution of Natural Bodies of Water by Petroleum-Containing Effluents from Electric Power Plants"]

[Text] Assuming particular importance at the present time is the curtailment of discharging effluents containing petroleum products into natural bodies of water, while future concern focuses upon converting electric power plants to operation on an internal-drainage system.

The solution to this problem is complicated by the fact that oil-polluted cooling water from the oil-coolers of the turbines and bearings of auxiliary equipment is, in a number of cases, included in the circuit of the main flow of the circulating water (Figure a), whereas existing possibilities and methods for purifying waste waters to the degree required by sanitary norms are extremely limited and expensive. Hence the need also arises to utilize effluent waters containing a certain allowable amount of petroleum products with a closed, circulating system for cooling condenser and other electric power plant units.

On the other hand, in order to exclude the entry of turbine oil into the circulating water-supply system of thermal electric power plants, in the first place it is necessary to devote the most serious attention to hermetically sealing the oil coolers, that is, to create oil coolers with thicker (up to 40 millimeters) pipe plates, allowing reliable, roller-type pipe connections to be made, as well as to ensuring the supply of high-quality, carefully tested pipes for the oil coolers, taking into account the quality of the cooling water to be used. A similar result may also be obtained by utilizing pipes made of stainless steel, when the hermetic nature of the connection may be brought about by welding the pipes together with the pipe plate. Moreover, in the oil coolers themselves it is possible to use double pipe plates, setting up drainage from the hollow chamber between them, as well as to apply a hermetic-seal coating (made, for example, of an epoxy composition, Nairit [chloroprene rubber, equivalent to neoprene], or the like) to pipe plates already in use [1].

The entry of turbine oil into the circulating water-supply system may also be averted by increasing the pressure of the cooling water in the oil cooler to a point higher than the oil itself (Figure b). In this case the oil system must be pre-equipped with a special apparatus to intensify moisture separation from the oil as well as with alarm signals to indicate the presence of large amounts of water in the oil. Provision must also be made for the possibility of introducing anti-oxidant, demulsifying, and anti-corrosive additives into the oil system in accordance with the recommendations of ORGRES [State Trust For Organization and Rationalization of Regional Electric Power Plants and Networks].

In all cases it is expedient to exclude from the oil-supply system high-pressure, autonomic oil coolers of the system whereby the generator shaft is packed (with hydrogen coolant) and to supply the packing system with oil which has already been cooled in low-pressure oil coolers of a lubrication system. Such a system has been developed at the Ural VTI [All-Union Thermotechnical Institute] for turbines of the LMZ (Leningrad Metal Plant) K-300-240 type, with generators of the TVV-320-2 type [2]. The Karmana and Sredneural'sk GRES's (State Regional Electric Power Plants) have already had favorable experience with prolonged operation of generators without autonomic coolers.

Finally, when oil drips and discharges are present along the shaft, the installation of spiral-groove packings (VKU) in the bearings is proposed, and a group of other measures is prescribed in order to prevent turbine-shaft oil leaks to the outside. A VKU design has been developed for turbines of the KhTGZ (Kharkov Turbogenerator Plant) K-300-240, LMZ K-300-240, and LMZ K-800-240 types at the Ural VTI, and there has been favorable experience in their utilization at the Karmana, Zaporozh'ye, Uglegorsk, and Chelyabinsk GRES's, as well as others [3].

According to investigations conducted by the Ural [All-Union Thermotechnical Institute] on a special testing stand, the presence of petroleum products in cooling water in an amount of up to 30 milligrams per liter did not produce any essential deterioration in the functioning of heat exchangers [4]. Therefore, as a temporary, mandatory measure prior to the introduction of hermetically sealed oil coolers and an increase in the cooling water pressure in the oil coolers to a point higher than the oil pressure, it would be expedient to set up special closed circuits of cooling water for the oil coolers and bearings of the auxiliary equipment with an outlet for the heat in the water-moderated, water-cooled heat exchangers of circulating water at a higher pressure than the cooling water of the oil coolers (Figure c), or with cooling the cooling water of the oil coolers and the auxiliary equipment in a special, modest-sized cooling tower (Figure d).

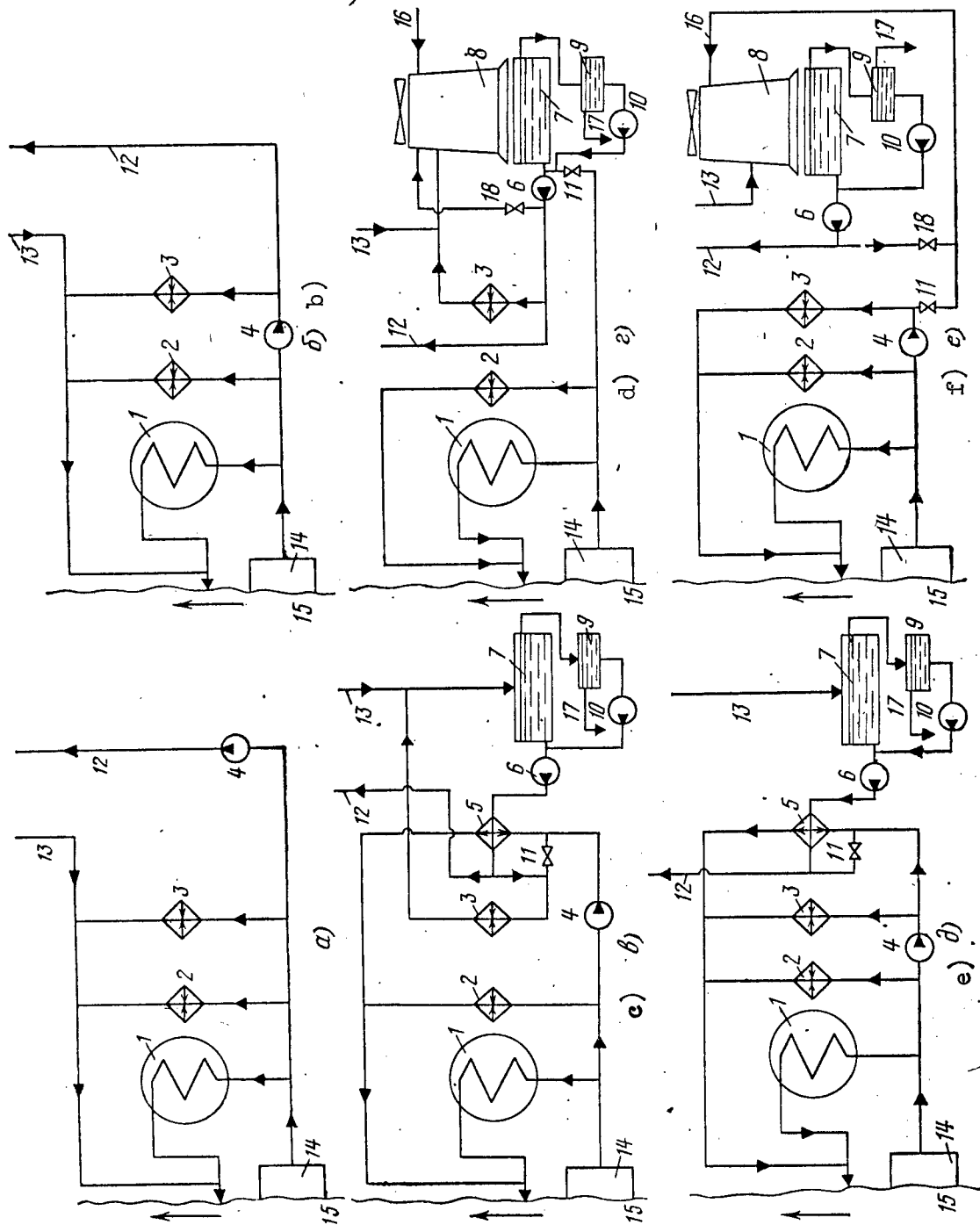
Calculations made at the Ural All-Union Thermotechnical Institute show that the cooling surfaces of water-moderated, water-cooled heat exchangers react in the same way as the cooling surfaces of oil coolers, and, in case of necessity, this fact allows them to be used as water-moderated, water-cooled coolers.

Inasmuch as the need is not excluded for cooling the auxiliary equipment, connected with the pollution of the cooling water by oil, even in the presence of practically absolutely leakproof oil coolers and a pressure of the water cooling them which is higher than the oil pressure, it is expedient to utilize a combined system, in which only the cooling water of the auxiliary equipment with its coolant is separated out into a closed circuit, or in a modest-sized, water-modified, water-cooled cooler at a higher pressure than that of the cooling circulating water (Figure e), or in a modest-sized cooling tower (Figure f).

The systematic diagrams cited in Figures c, d, e, and f, depending upon the degree of oil concentration in the cooling water provide for the periodic overflow of oily water from the cooling water tanks 7 into the settling tank 9, from which the oil is collected and, for example, burned in furnaces of the GRES steam boilers, while the remaining water is returned by a pump 10 into the cycle of closed cooling.

As a top-priority measure to reduce the oil concentration in the water in case of a break in the oil-cooler pipes, it is recommended that multistage oil traps [5] be installed in all existing systems at the points where the cooling water drains out of the oil coolers and from auxiliary equipment. Since there is a danger that with an oil concentration in the cooling water of five milligrams per liter and higher an oil-type aerosol would be formed in the cooling towers, powerful enough to have a toxic effect on the human organism, supplementary water must be supplied by means of special sprayers into the top part of the cooling tower in order to avoid the escape of oil particles from the tower; this water would hinder the carry-off of the oil particles contained in the steam-air-oil mixture escaping from the cooling tower. But if it appeared that the amount of supplementary water would not be sufficient, then the recirculation of cooling water would be utilized for this purpose with the aid of gate valve 18.

The line diagrams and design solutions cited below, which prevent the entry of petroleum products into the circulating water-supply system, as commissioned by the Glavniiprojekt [Main Administration of Scientific Research and Planning Organizations] and Glavtekhupravleniye [expansion unknown] of the USSR Ministry of Power and Electrification, were jointly worked out by the Ural All-Union Thermotechnical Institute, the All-Union Thermotechnical Institute, Teploelektroproyekt [All-Union Institute for Planning Electrical Equipment For Heat Engineering Structures] and VNIPIenergo prom [All-Union Scientific Research and Planning Institute of the Power Industry].



Line Diagrams of a GRES Circulating Water Supply

[Key on following page]



Key:

- a. material diagram
  - b. diagram with the cooling water pressure of the oil coolers higher than the oil pressure in them
  - c. closed-circuit diagram of cooling oil coolers and auxiliary equipment with water-moderated, water-cooled cooler
  - d. closed-circuit diagram of cooling oil coolers and auxiliary equipment with cooling tower
  - e. combination diagram with closed circuit for cooling auxiliary equipment with water-moderated, water-cooled cooler
  - f. combination diagram with closed cooling of auxiliary equipment with cooling tower
1. turbine condenser
  2. air cooler (liquid heater)
  3. oil cooler (liquid heater)
  4. hydrostatic-head pump
  5. water-moderated, water-cooled cooler (liquid cooler)
  6. pump for closed-circuit cooling
  7. collecting tank
  8. cooling tower
  9. settling chamber (trap)
  10. transfer pump
  11. gate valve for water-level feed maintenance of closed-circuit cooling
  12. water for cooling auxiliary equipment
  13. cooling water from auxiliary equipment
  14. circulation pumping station
  15. river
  16. supplementary water
  17. oil overflow [drain]
  18. gate valve for allowing supplementary water to flow through to sprayers

Conclusions

1. Considering the present-day state of oil coolers, the simplest and most reliable system, not requiring great expenses to carry out, must be considered the closed system of cooling oil coolers and auxiliary equipment with cooling of their cooling water in a modest-sized cooling tower.
2. With practically absolutely leakproof oil coolers the use of a combined system of a closed circuit for cooling the auxiliary equipment and a cooling tower may be allowed.

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APPEAL FOR CONTINUED BAN ON DDT

Stockholm DAGENS NYHETER in Swedish 18 Aug 77 p 26

[Article by Birgitta Nyblom]

[Text] "The minister of agriculture ought to speak out now and assure us that the ban on DDT will be continued!" That was the appeal made on Wednesday by the Stockholm County District of the CUF (Center Party Youth Association). The district has learned that practically all the forestry firms are exerting pressure on the government to lift the ban on spraying with DDT. The forest owners have discovered "snytbaggar" [a type of beetle] in their clearcut areas and are asking the government for permission to dip their conifer seedlings in DDT. If permission is not granted, Swedish exports will decline.

District Chairman Jan Björinge maintains: "The reason these beetles are getting into the cutting areas and eating up the seedlings is that logging is being done in the wrong way. They do their cutting with big logging equipment that does not remove branches, brush, and rocks. The result is that the beetles thrive and multiply."

He said, "They should quite simply stop using those logging machines in the cutting areas. Instead, they should do the thinning and clearing by hand (that is, with power saws and power clearing saws). Then there would be more natural seeding, and the branches and stumps could also be used for paper pulp."

He pointed out that for the government, the dilemma is that exports are being lost.

"But it is intolerable that we should pay in the form of poisoned human beings to insure cheaper exports. The government must decide how much can be taken out of the forest. And when that limit is reached, we must resort to recovery by other methods."

Jan Björinge explained, "Besides, using DDT is a shortsighted method. Everyone knows that harmful insects gradually develop resistance. So it is not even defensible economically if one takes the long view."

DDT was banned in Sweden in 1969. It is a hydrocarbon that does not break down in nature over a foreseeable period of time. It builds up in the food chain. The CUF District calls attention to the fact that Sweden has often been viewed as an international model.

The decision to ban DDT has been imitated in several European countries, most recently in West Germany. The ban has brought improvements. The CUF youth organization asks, "Are those gains going to be thrown away now in order to increase profits for the forest corporations?"

The district calls attention to the fact that the DDT content increases steadily from the small seed all the way up to the animals at the end of the food chain. Humans are also part of the food chain, and the crisis affecting the large birds of prey must be viewed as a serious warning. The question is: how soon will humans be harmed?

"In the opinion of the CUF District, the alternative is the intensive use of the forest through other methods of exploitation."

Jan Björinge said, "The trouble is that spraying the clearcut areas with phenoxy acids is not dangerous enough to make people put a stop to the spraying. We are demanding a ban on all the phenoxy acids used to control vegetation."

The CUF's Stockholm County District is now going out with a list to collect the names of those favoring a continued ban on DDT. Even the Field Biologists organization is joining in this campaign to collect signatures. The sponsors expect to be able to meet with Minister of Agriculture Anders Dahlgren in September. The young people are convinced that a large section of public opinion opposes the use of DDT.

On the eve of the district's own fall meeting, it is also being demanded that the use of poisons in agriculture and forestry be replaced by labor-intensive and area-intensive methods.

The district is also demanding that the communes be given the right to veto the use of poisons within their boundaries.

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ATTENTION FOCUSES ON FOREST SPRAYING

Possible Effects Discussed

Stockholm DAGENS NYHETER in Swedish 17 Aug 77 p 21

[Article by Per Sjogren]

[Text] The spraying of Swedish forests with phenoxy acids (herbicides) has decreased substantially. Of a total forest area of 23 million hectares, between 20,000 and 30,000 are being sprayed this year. That amounts to about 1 per 1,000. On the other hand, 70 percent of all grain is sprayed with those agents. This does not affect the grain crop, and the use of those herbicides in agriculture is regarded as an environmental problem that has disappeared from the discussion. The debate is concerned only with forests.

Phenoxy acids appeared in Great Britain and the United States in the early 1940's as a possible weapon in the struggle against Hitler's Germany, but they were never used in World War II. Their only wartime use occurred in Vietnam during the notorious defoliation operations carried out by the Americans, but in those actions they were used in a much stronger concentration than has ever been the case with their civilian use in Sweden.

This herbicide was registered in Sweden in the late 1940's, but there was much less knowledge then concerning poisons and the dangers involved in their use than there is now. There are several different kinds of phenoxy acids, but three have been and still are of topical interest.

The first is MCPA [2-methyl-4-chlorophenoxyacetic acid], used mainly in agriculture.

The second is 2,4-D [2,4-dichlorophenoxyacetic acid]. It is used in clear-cutting areas by the forest industry and also, to some extent, in agriculture.

The third is 2,4,5-T [2,4,5-trichlorophenoxyacetic acid], formerly used only in forestry. It was totally banned in the spring of 1977.

The active elements in these herbicides are phenoxy acids (acetic acids), which do not affect coniferous trees and grain but do kill broadleaf trees, shrubs, and weeds.

#### A Few Weeks

The way in which phenoxy acids affect plants is not entirely clear, but sprayed plants that are susceptible to this herbicide wither and die within a few weeks.

Farmers use these herbicides to get rid of weeds in their grainfields. They do their spraying almost entirely in the spring, and by the time the grain is harvested in late summer, no poison is left in the plants, according to Prof Christoffer Rappe of Umea University. Rappe is one of the few researchers in Sweden to have gone all out in opposition to the use of phenoxy acids in forestry, but he is not at all interested in their use in agriculture.

He told DAGENS NYHETER, "That is a problem that concerns the working environment."

#### Grams Kill

A few grams of phenoxy acid can kill a man. The toxic effect is due mainly to one substance--dioxin--that is present in the compound used to spray forests but not in the mixture used in agriculture.

One indisputably dangerous dioxin is TCDD [tetrachlorodibenzo-p-dioxin], a relatively high percentage of which was present in the compound 2,4,5-T, now banned.

In animals, it has been shown that TCDD damages the foetus. Investigations into whether dioxins and phenoxy acids cause cancer in animals have produced conflicting results. Recent research in Germany and Czechoslovakia shows that workers exposed to TCDD during the manufacture of herbicides seem to suffer from a greater frequency of tumor disorders. But it is not clear whether dioxins produce cancer in humans or whether their effect is indirect in that they increase the cancer-producing effect of other substances without themselves having that property.

There have also been fears that elements in these herbicides may produce foetus damage in humans, but a rapid study earlier this year by the Swedish Social Welfare Board did not support those apprehensions.

#### Total Ban

International studies also show that in concentration, these herbicides cause skin changes, metabolic disturbances, and mental disorders.

The attitude of Swedish authorities toward the dangers of phenoxy acids has fluctuated. In 1971-1972, those chemicals were totally banned in forestry. The ban was later lifted, subject to certain restrictions, but aerial spraying was not permitted.

In the spring of 1975, 2,4,5-T was banned completely, and in the spring of last year the aerial spraying of forests was again permitted.

Since 1 May of this year, stricter regulations have governed aerial spraying in forests.

Permits are issued by the Products Control Office (a department of the National Environment Protection Board) in consultation with the National Board of Forestry in Jonkoping.

The police must be notified when a spraying operation is planned, and those responsible for the spraying must insert notices in the local press and see to it that signs warning of the spraying are posted.

Certain special rules are in effect in the mountain areas, where spraying can only be done after consultation with the Lapp communities.

#### A Few Weeks

Forest spraying is carried out in some of the clearcut areas to facilitate the new growth of conifers. The faster-growing broadleaf trees are thus killed so that the conifers will have a chance. But this procedure is considered necessary only in some areas. In others, the coniferous forest does all right by itself.

The spraying is done over a period of several weeks in late summer. The conifer shoots must first become strong enough to escape damage, and on the other hand, the spraying will be ineffective if the leaves on the deciduous trees have begun to turn yellow. That short spraying season coincides with the weeks when people are going out into the woods to gather berries and mushrooms.

The concern caused by these herbicides arises from the fact that one cannot be certain of how dangerous they are over the long term. All the more since the plant control measures in question are carried out at a time when people are out in the woods in greater numbers than at other times of the year.

#### More Berries This Year

This year there are more berries and mushrooms in the woods than there have been for several years. The stage is therefore set for confrontations. In Varmland and in a number of Norrland communes, there have been environmental conflicts in the face of planned summertime spraying. In Dalarna last Sunday, people were sprayed.

A few years ago, about 90,000 hectares of forest were being sprayed with these chemicals. The National Board of Forestry told DAGENS NYHETER that the figure this year will come to 20,000 or 30,000 hectares. Use has therefore declined considerably, but if the rules are not made more stringent, it can be expected that aerial spraying may cover about 100,000 hectares over the next few years. The Swedish forest covers 23 million hectares, so this year's spraying will affect about 1 hectare per 1,000.

#### Not in Water

These clashes between the sprayers and others do not occur in the case of agriculture. Agricultural spraying is done from the ground, and the Right of Common Access does not apply to cropland--we are not allowed to tramp around on other people's crops.

But farmers are not allowed to spray in such a way that chemical agents might get into the water.

In parks and athletic fields, chemicals are totally banned as a means of combating weeds.

There are seven or eight large forest owners in Sweden, and one of them is Mo and Domsjo [MoDo], whose head office is in Ornskoldsvik. Since 1970 that firm's 640,000 hectares of forest have not been sprayed at all. Among the big forest owners, it is the only one so far to have given up the practice.

The reason is that MoDo has started growing Swedish birch and conifers in its forests instead of the more common silver birch. Swedish birch is used in the firm's manufacture of fine paper.

#### Little Benefit

When the decision was made 8 years ago to halt spraying, it was felt that the economic benefit to be gained from spraying was so small that it could be disregarded. Instead, broadleaf trees were cleared away by hand where necessary.

Today it is considerably more expensive to clear them away by hand, but the firm nevertheless does not intend to change its policy, even though MoDo's people are occasionally rapped on the head by the rest of the forest industry because they go their own way.

#### Politicians Have Responsibility

Stockholm DAGENS NYHETER in Swedish 17 Aug 77 p 21

[Commentary by Bo B. Melander]

[Text] Widespread dissatisfaction over the situation with chemicals in our society--our poisoned environment--exists in the population, and it is growing.



And in connection with the use of phenoxy acids by the forest industry, agriculture, communes, and firms to control vegetation, the struggle has turned really tough.

Dissatisfaction is an important tool--perhaps the best--when we find it necessary to keep a critical eye on our chemical realities. Our experiences have been depressing.

For that reason, these questions must no longer be buried in debates between researchers and in 10-year studies--which often end in disagreement--while the use of chemicals is allowed to go right on!

Here the politicians have a responsibility. It cannot be their business in questions of this kind to surrender to experts the right to decide. The experts are often ensnared in the business community's ways of economic thinking, a fact that Hans Palmstierna once drew attention to. He took his lumps for it.

#### Politicians Have Two Choices

People are alarmed. It is up to the politicians to reach a decision in a situation where the action by experts, corporations, and government officials is based on an old view of society that allows enormous risks to be taken in the name of profit.

The politician might take responsibility by going to the people and saying:

"There is uncertainty concerning these substances. But there are a great many risks in society, and it is necessary to the national economy to take what we believe is a minor risk."

The politician might also say:

"Uncertainty in our chemical era is growing. We know too little about all the consequences of the use of chemicals. In the long run, it is important from the standpoint of the national economy to have a poison-free environment. We will make it a rule that when the question of using chemicals comes up, we will not give it the benefit of the doubt."

This includes not only herbicides or phenoxy acids, but all of our chemical realities. A number of substances appear on the market every year. Few of them have been tested to determine their cancer-causing effects or the genetic damage they might do. Such tests are difficult and take a very long time.

#### Responsibility Relinquished to Corporations

In this way, society would be taking responsibility for the use of chemicals about which we really know very little. As it is, that responsibility has been shifted to the corporations.

In recent years, as we have come to pay attention to the dangers to the environment and to people, a huge regulatory bureaucracy has begun to develop, along with research organizations whose purpose is to come to grips with the most controversial bits of the debate. There are other elements in the flood of chemical products that we have not yet begun to discover.

In itself, this big apparatus is important. But who in it is able to get a general view of our total activity with chemicals? Who decides when the usefulness of a substance outweighs the possible risks? Who is it that actually weighs out all the factors?

Considering the element of truth in Gunnar Strang's slogan--"What's good for industry is good for Sweden"--it is no wonder that the politicians have achieved extraordinarily little influence over these matters, all in the name of a free market.

Decisions Must Be Based on Prudence!

The influence of the politicians must be strengthened, and their decisions must be based on prudence, even though the corporations yell foul and call for proof--and try to make comparisons with the morals of other countries on the same subject.

For too long the politicians have been administering a development of society which in this particular area eventually leads to cries of panic and camouflage tactics.

In the case of aerial spraying, automobile exhaust, working environment, and, in fact, the operation of the entire chemical complex, society ought to see to it that "soft data" such as anxiety and dissatisfaction carry considerably more weight in the decisionmaking process.

Especially since an extremely prudent policy in this area improves the quality of life. Shortsighted economic laws in our society form the wrong foundation on which to evaluate risks.

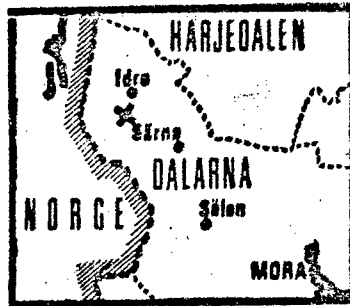
#### Demonstrations Are Provoked

Stockholm DAGENS NYHETER in Swedish 17 Aug 77 p 21

[Article by Agneta Carlsson]

[Text] The area being sprayed by the Swedish Forest Service in northern Dalarna lies between Idre-Sarna and the Norwegian border. About 300 hectares are to be cleared of broadleaf vegetation with the help of herbicide.

"A ridiculously small area" is the expression used by everyone involved. When the Forest Service describes it that way, what it means is that the area is so small that it is really nothing to make a fuss about. But the local



inhabitants interpret the phrase quite differently: the area is so small that it could just as well be cleared by hand.

Staffan Steinwall, who is a forest ranger for the Forest Service, says, "You don't let inexperienced people into your forest to do the clearing work."

But the inhabitants insist: "With an experienced forest man as foreman, anybody at all can do the job."

The inhabitants of Idre-Sarna first heard about the spraying at the end of July. Added to the Forest Service's 300 hectares are 940 hectares belonging to a private corporation, the Idre-Sarna Joint Forest Company, for a total of almost 1,000 [as published] hectares of forest.

"Unacceptable"

"We are protesting because we cannot obtain adequate guarantees that the herbicide is not dangerous. We feel that no one is able to tell us that the poison is acceptable. And we do not want to live in a forest that has been sprayed with poison."

"You cannot help being uneasy when you think of the future and of what may happen to the land in the long run."

There were about 20 persons in the group that gathered on Tuesday morning. They had kept a constant watch on the corporation's movements during the week immediately before.

Last Monday evening a few people found a helicopter fitted up with barrels of poison and standing in a very lonely spot in the woods.

As many as could manage it gathered at 0700 hours on Tuesday at a little graveled area where the helicopter stood. The Forest Service's manager was very surprised to see them and wondered how they had found the place.

The graveled area was so small that when the helicopter was coming down for a break, it knocked off the top of a pine tree right behind the people.

Stig Ericsson said, "It is obvious that they were trying to hide. They were afraid there would be a commotion, and the spot was carefully chosen."

Among those who gathered at the clearing were Anders Ejdervik; Robin and Christina Nilsson; Maud Berg; Holger Karlsson; Nils-Olof Wikstrom; Edvin, Maria, and Malin Berndtsson; Kerstin Angelstrom; and Birgitta Dahlgvist.

At no point was there any disturbance.

"We did not intend to create any. The Forest Service is not committing any illegal act, of course--just an immoral one.

"We gave the manager an opportunity to call off the spraying by inviting him to a mass meeting and informing him of the population's position. We presented lists of names totaling 1,600 signatures--almost 80 percent of the area's entire adult population. A total of about 3,000 people live in the district."

"Cannot Read"

Anders Ejdervik said, "The entire ecological balance is changed when the broadleaf trees disappear. The birds don't go there any more, and a lot of other things are also affected.

"What about the tourists who do not understand the notices saying that the areas have been sprayed, and children who cannot read--how are they supposed to find out that the woods have been sprayed with poison?"

No such information was included in the public notice inserted in the press to announce that the spraying would take place. Nor does it appear on any of the notices that have been posted.

Staffan Steinwall answers that by saying: "How can we give that information when we ourselves don't know how dangerous it is? Naturally, one should not eat the berries, and cows should not graze on the grass immediately afterward. Maybe we should have announced that as well."

"Only My Job"

Staffan Steinwall finds the people's opposition somewhat irritating:

"I am only doing my job, and that does not mean that I approve of herbicides. As a matter of fact, I feel that it is not a good idea to add substances to the soil that are not already there. But the forest firms base their decisions on economic factors. We have to trust the experts, and they say that the herbicide is not dangerous if it is handled properly."